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EXPLANATION OF PLATE IV.

- Fig. 1. One of the middle joints of the antennae of *Aganais ficus* ♀, side view.
 ,, 2. The same, front view.
 ,, 3. ,, ,, of ♂, front view.
 ,, 4. ,, ,, ,, ♂, dorsal view.
 ,, 5. ,, ,, ,, *Asota caricacae* ♂, side view.
 ,, 6. ,, ,, ,, ,, ,, ♂, front view.
 ,, 7. ,, ,, ,, *A. heliconia* ♀, front view.
 ,, 8. ,, ,, ,, ,, ♂, ,, ,, from distal side.
 ,, 9. ,, ,, ,, ,, ♂, ,, ,, ,, proximal side.
 ,, 10. ,, ,, ,, ,, ♂, side view.
 ,, 11. ,, ,, ,, ,, ♂, dorsal view.
 ,, 12. Clasper with harpe of *Asota heliconia semifusca*.
 ,, 13. Harpe of same, side view.
 ,, 14. ,, ,, ,, dorsal view.
 ,, 15. Clasper with harpe of *A. egeus*.
 ,, 16. Harpe of same, dorsal view.
 ,, 17. The same of another individual.
 ,, 18. ,, ,, ,, *A. caricacae*, side view.
 ,, 19. ,, ,, ,, ,, ,, dorsal view.
 ,, 20. ,, ,, ,, another individual, side view.
 ,, 21. ,, ,, ,, ,, ,, dorsal view.
 ,, 22. ,, ,, ,, *A. palinura*, dorsal view.
 ,, 23. Clasper with harpe of *A. ficus*.
 ,, 24. Harpe of same, dorsal view.
 ,, 25. ,, ,, ,, side view.
 ,, 26. Clasper with harpe of *Peridrome orbicularis*.
 ,, 27. ,, ,, ,, ,, *Euplocia memblitaria*.
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 ,, 29. ,, ,, ,, ,, *N. eugenia butleri*.
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 ,, 32. Uncus of *Asota heliconia intacta*, dorsal view.
 ,, 33. ,, ,, ,, ,, ,, side view.
 ,, 34. ,, ,, *Spilobotys chloropygia*, dorsal view.
 ,, 35. ,, ,, ,, ,, side view.
 ,, 36. Fold before cavity on forewing of *Asota heliconia*.
 ,, 37. The same of *Aganais ficus*.
 ,, 38. ,, ,, ,, *Peridrome orbicularis*.
 ,, 39. ,, ,, ,, *Neochera eugenia*.
 ,, 40. ,, ,, ,, *Digama hearseyana*.
 ,, 41. Costal portion of hindwing of *Asota heliconia* to show patch of thick scales before costal nerve.
 ,, 42. Some scales of that spot.
 ,, 43. The homologous organ of *Digama hearseyana*.
 ,, 44. A scale of that mark of *Asota heliconia*.
 ,, 45. The same of *Neochera bhawana*.
 ,, 46. End of abdomen of *Asota plaginota* ♀.
 ,, 47. The same denuded.
 ,, 48. End of abdomen of *Asota caricacae* ♀.
 ,, 49. The same denuded.

* There are too many stripes both in this and the next figure : see pages 194 and 208.

A single specimen was obtained by Mr. W. Day of the unfortunate Clarke Expedition on the Clyde River, within a few miles of the frontier between British and German New Guinea.

The same collection contained also *Gonyocephalus pupuensis* (McL.), *Lygosoma mülleri* (Schleg.), *Lygosoma macrurum* (Günr.), *Lygosoma cyanurum* (Less.), *Lygosoma jobiense* (Meyer), *Gymnodoctylus louisadensis* (De Vis), *Hyla dolichopsis* (Cope).

The figure I on Plate VIII. represents *Xenorhina atra*, the other figures (2 and 3) the beautiful *Diplopelma banguranum*, described Nov. Zool. II. p. 501.

NOTES ON HETEROCERA, WITH DESCRIPTIONS OF NEW GENERA AND SPECIES.

By THE HON. WALTER ROTHSCILD AND DR. KARL JORDAN.

(Plate IV.).

AGANAIDAE (= HYPSIDAE) (*continued from p. 62*).

Aganais Boisd. (*continued*).

ALTHOUGH I agree with Dr. K. Jordan (*see p. 62*) that the difference in colour and pattern of the hindwings of *speciosa* (Drury), *undulifera* (Wlk.), and *subretracta* (Wlk.) is of no importance whatever in respect to specific or subspecific distinctness of these forms, I am not certain whether this species of *Aganais* could not be separated in two subspecies, one inhabiting West Africa from Sierra Leone to Angola, and the other occurring in South and East Africa. In the *male* sex, the South and East African specimens seem to me to be distinguishable from West African examples by the presence of a white band on the underside of the forewings outside the cell; this band runs from the costa mostly as far as the second median nervule. In West African individuals the band is either absent, or slightly marked behind the costal margin. My series of West and East African *males* is not large enough to decide if this distinguishing character holds good.

When writing the note on the varieties of *A. speciosa* on p. 62 I was not aware that in the December number of *Entomologische Nachrichten* p. 369, t. IV. f. 5 (1895) Karsch described and figured that form of ab. *undulifera* which has ochraceous hindwings as a new species, *Pseudhyppsa baumanniana*.

Add to the four aberrational names this as fifth:—

5. Hindwings ochraceous, with black border: ab. *baumanniana* (Karsch).

W. R.

Anagnia Walker.

Hyppsa. Group 2. *Anagnia* Walker, *Lep. Het. B. M.* II. p. 446 (1854).

Anagnia Moore, *Cat. Lep. Ins. Mus. E. I. C.* II. p. 296 (1859): *Bull. Tr. Ent. Soc. Lond.* p. 327 (1875); Kirby, *Cat. Lep. Het. I.* p. 383 (1891): Swinh., *Cat. Lep. Het. Oxf. I.* p. 83 (1892).

Hyppsa, Snellen, *Tijdschr. v. Ent.* XXXI. p. 123 (1888).

Peridrome Wlk. *Seet. II. (Anagnia)*, Hampson, *Moths of India I.* p. 467 (1892).

The genera *Anagnia* Wlk. and *Peridrome* Wlk. are remarkable for the development of conspicuous scent-organs in the *males*, which have much influenced the

structural characters of the species, more particularly so in *Anagnia* than in *Peridrome*.

As explained under *Asota* Hb., every joint of the antennae of *Aganaiidae* bears (as in most other HETEROCERA) dorsally two transverse rows of elongate scales. In the *male* of *Anagnia subfascia* Wlk. the scales are partly less, partly more, prolonged, which disturbs the serial arrangement; on a number of joints beyond the middle of the antennae the scales are more than twice as long as usual, protrude laterally (and horizontally), and form a kind of tuft; the joints are not flattened, as Snellen says, *l.c.*, nor are they so thickened as in the utterly incorrect figure in *Tijdschr. v. Ent.* XXXI. t. 1. f. 1^a. The subdorsal setae of these joints are thicker than those of the other joints. In the *female* the scaling of the antennae is normal.

The second joint of the palpi bears in the *male* of *Anagnia* dorsally at the apex a tuft of elongate scales; the third joint is somewhat broadened towards the tip, and has a slight dorso-lateral carina. The scales at the interno-lateral portion of the upperside of the third palpal joint are prolonged, and being directed for- and upwards form a kind of crest; on the ventral side of the joint the scales are long only towards the apex, and are here directed backwards.

In the *female* of *A. subfascia* the second joint is $\frac{1}{2}$ mm. shorter, the third $\frac{1}{2}$ mm. longer, than in the *male*, and both joints are without tuft- or crestlike scaling.

The scent-organs on the fore- and hindwing of *A. subfascia* Wlk. have been described by Haase, *Iris* I. p. 167 (1887). I have to add that the elongate (hairlike) scales on the upperside of the forewing are, between costal margin and median nervure, directed backwards, while the scales of the rest of the woolly surface are directed obliquely forwards; in *Peridrome orbicularis* Wlk. all the hairlike scales are directed backwards.

The apical region of the forewing of *A. subfascia* is nearly normally scaled. On the hindwings above the scales are narrower in the *male* than in the *female*.

The venuration of the *male* of *Anagnia* is, in consequence of the development of the scent-organs, much distorted. In Hampson's figure, *l.c.* p. 448. f. 331, the venuration is incorrect. The cell of the forewing is strongly narrowed from the origin of vein 2 to the upper angle, which is very acute. Veins 2, 3, 4, and 5 are of equal distance from one another ($\frac{2}{3}$ mm.); in the apex of the cell projects a veinlet which originates between veins 4 and 5, and is seldom so plainly marked in other Aganaiids as here; the upper discocellular veinlet, between vein 5 and the areole, is parallel to the costa; vein 6 comes from the areole; the basal portion of the areole, below the upper angle of the cell, is a half shorter than the apical or outer portion.

On the hindwing the upper discocellular veinlet is very oblique; veins 2 and 3 are shortly stalked together, and stand closer to vein 4 than this does to 5; veins 6 and 7 are stalked together.

The venuration of the *female* does not show that distortion in the apical region of the cell to either wing. The cell to the forewing is broadest towards the apex; the second partition of the median nervure, between veins 2 and 3, is nearly three times as long as the third portion, between veins 3 and 4; the upper discocellular veinlet is deeply incurved; vein 6 comes from the upper angle of the cell, not from the areole as in the *male*; the areole is much shorter than in the other sex, and its basal and apical portions are of nearly equal length. On the hindwing the cell is longer than in the *male*; vein 2 stands separate from 3; the second partition of the median nervure is about twice as long as the third partition.

Snellen, *l.c.*, united *Anagnia subfascia* Wlk. and *Peridrome orbicularis* Wlk. to

a subgenus of *Asota* (= *Hypsa*) which he calls *Aganopsis* Butler. The genus *Aganopsis* is erected by Herrich-Schäffer, *Duss. Schnell.* pp. 12 and 70, for *Peridrome orbicularis* Wlk., and has been described neither by its author nor by Mr. Butler. Why Snellen gave preference to this younger *nomen nudum*, instead of accepting the older name of *Anagnia* Wlk., I cannot understand, the more as Walker's diagnosis of *Anagnia* is not at all bad.

Snellen says, *i.e.*, that *orbicularis* Wlk.—Snellen writes *orbicularia* Moore—and *subfascia* Wlk. are different from the species of *Asota* (= *Hypsa*) only in the *male*; we shall see that this is not the case.

Hampson, *i.e.*, treats *Anagnia* Wlk. and *Peridrome* Wlk. as sections of *Peridrome* Wlk., and differentiates the two "sections" only by the secondary characters of the *males*. We can neither agree with Snellen nor with Hampson, though in one point both authors are perfectly right—namely, in objecting to base genera on differences in secondary sexual characters.

Peridrome and *Anagnia* may be characterised as follows:—

Anagnia, ♂ ♀: Second joint of palpi at least half as long again as the third. Stridulating organ different from that of *Asota* Hb.; fold before cavity on forewing short, narrow, and covered with an irregular row of (twelve to fifteen) large but rather thin scales, here and there two or three scales of different size beside one another: on upperside of hindwing there is in ♂ a patch of thick scales near the base close to the black portion of the strongly developed scent-organ; in ♀ these thick scales are situate in the middle of costal region between costal vein and centre of apex of cell.

Neuration: Areole nearly as in *Asota*; vein 9 terminating in costal margin, vein 7 in apex of wing, which is quite an exception amongst *Aganuidæ*; second partition of median nervure of either wing much shorter than the respective portion of the outer margin; veins 6 and 7 of hindwing on a short stalk (in nine individuals before me).

Peridrome, ♂ ♀: Second joint of palpi about one-fourth (or less) longer than the third, slenderer and longer than in *Asota*. Cavity on forewing, as in *Euplocia*, deeper than in *Anagnia* and *Asota*, and basally sharply limited; fold before it as in *Anagnia*: corresponding patch of thick scales on hindwing standing in ♂ before and in apex of cell, in ♀ much more restricted than in ♀ of *Anagnia*.

Neuration: Vein 11 of forewing originating before middle of cell, areole much longer than the cell is broad; vein 8 terminating in apical angle of wing; second partition of median nervure of either wing about as long as the respective portion of outer margin; veins 6 and 7 of hindwing from a point, not stalked.

As the neuration and the stridulating organ are of remarkable constancy amongst the numerous species of *Asota* Hb., the peculiar development of these organs in *Anagnia* and *Peridrome* proves certainly that the species of *Asota* are much closer allied with one another than they are with *orbicularis* and *subfascia*, and that therefore these two insects cannot be included in *Asota*, as Snellen does. Whether *Anagnia* and *Peridrome* must be kept separate as two genera—that is another question. The chief differences between them are these: vein 11 stands before middle of cell in *Peridrome*, far beyond middle of cell in *Anagnia*; the basal portion of the areole is at least twice as long in *Peridrome* as in *Anagnia*; the second partition of the median vein of either wing is much shorter than the respective partition of the outer margin in *Anagnia*, while in *Peridrome* the partition is at least as long as the partition of the margin; vein 7 of forewing

terminates in apical angle in *Anagnia*, in *Peridrome* it is vein 8 which terminates there; on the hindwing veins 6 and 7 come from a point in *Peridrome*, and are stalked together in *Anagnia*. The second joint of the palpi is in *Anagnia* at least half as long again as the third one, whilst in *Peridrome* the second joint is only one-fourth longer than the terminal one. Moreover, the antennal joints of *Peridrome* are vertically broader than those of *Anagnia*; in the *male* of *Peridrome* the base of each joint forms a short subcylindrical stem, distinctly visible under a lens, and consequently the ventral subcariniform portions of two subsequent joints when looked at from the side are rather widely separate; while in *Anagnia* that stem is very short, and the ventral free portions of the joints are much closer together.

These discrepancies in the characters of *orbicularis* and *subfascia* not only justify a generic separation of the two insects, but demand it, considering that, if we in this case neglect such differences, we have consequently to do it also amongst the other Arctoid and Lymantrioid moths.

K. J.

Peridrome Walker.

Hypsa. Group 1. *Peridrome* Walker (*see Peridroma* Hübner, *Verz. bek. Schmett.* p. 227, 1816), *Lep. Het.* B. M. II. p. 444 (1854).

Aganopsis Herrich-Schäffer, *Auss. Schmett.* I. p. 12. 70 (1855) (*Nom. nul.*); *Butl., Tr. Ent. Soc. Lond.* p. 325 (1875) (*Nom. nul.*).

Anagnia, Moore (*see* Walker, 1854), *Cat. Lep. Ins. Mus. E. I. C.* II. p. 296 (1859).

Hypsa. A. (*Aganopsis* Butler), Snellen, *Tijdschr. v. Ent.* XXXI. p. 123 (1888).

Aganopsis, Kirby, *Cat. Lep. Het.* I. p. 384 (1891).

Peridrome, Hampson, *Moths of India* I. p. 496 (1892) (*Er p.*); Swinh., *Cat. Lep. Het. Of.* I. p. 82 (1892).

Compare the notes under *Anagnia*.

There is, as in *Anagnia*, only one species known of this genus, and that is probably the reason why some entomologists objected to keeping *Anagnia subfascia* Wlk. and *Peridrome orbicularis* Wlk. generically separate.

P. orbicularis Wlk. occurs from Sikkim to Sambawa and the Philippine Islands. The variability of the species is but slight. In the *male* the size of the black spots on the underside of the wings is rather inconstant at every locality; the black spot at the anal angle of the hindwing above is sometimes absent. The black spots on the wings of the *female* also are not quite constant either in size or number.

Our only *female* from Sambawa differs remarkably from all our other *females* in the following particulars: the black discal spot on the forewing behind the middle of the cell, above and below, stands farther towards the base; a line drawn to connect the origin of vein 2 with the middle of the stridulating organ would be situate outside the spot, while in the specimens from other localities it would stand at the basal side of the spot; the orange region of the forewing above and below does not extend beyond the origin of veins 3 and 4; the black mark in the anterior angle of the cell to the same wing below is larger, rectangular; the blackish brown border to the hindwings is broader, having a width of 11 mm. at vein 7 and of 7 mm. at vein 4, while the respective measurements are in Indian examples 9 and 5 mm., or less. The *males* from Sambawa do not seem to me to be different from typical *orbicularis* Wlk.

P. orbicularis Wlk. is in the Tring Museum from Assam, Calcutta, Andaman Islands, Natuna Islands, Pulu Laut (S.E. of Borneo), Palawan, and Sambawa; Dr. Standinger lent us a ♀ from Java.

K. J.

Euplocia Hübner.

Phalaena Bombyx, Cramer, *Pap. Ex.* III, p. 175 (1782).

Euplocia Hübner, *Verz. bek. Schmett.* p. 172 (1816); *Batl., Tr. Ent. Soc. Lond.* p. 327 (1875);

Snellen, *Tijdschr. v. Ent.* XXXI, p. 118 (1888); Kirby, *Cat. Lep. Het.* I, p. 390 (1891); Hampson, *Moths of India* I, p. 495 (1892); Swinh., *Cat. Lep. Het. Oef.* I, p. 83 (1892).

Hyppsa, Group 3, *Euplocia*, Walker, *Lep. Het. B. M.* II, p. 417 (1854).

Aganais, Snellen, *Tijdschr. v. Ent.* XXII, p. 77 (1879).

As explained by Snellen, *l.c.* XXXI, p. 118 (1888), this genus is distinguished in the neuration by veins 6 and 7 of the forewing being stalked together, by veins 4 and 5 of fore- and hindwing coming from a point, and by the very narrow areole.

The antennae of the ♂ rather resemble those of *Neochera inops* (Wlk.) and *Asota caricæ* (F.). The terminal joint is a little longer than the preceding ones; these are scarcely a fifth longer than (dorso-ventrally) broad; from the tenth joint they become gradually broader than long, and are in the middle of the antennae as broad as in *Neochera marmorea* Wlk. The joints are compressed, without the lateral impression found in most species of *Asota*, clothed with short hairs, which are about a third the length of the middle joints; the ventral and subdorsal bristles are a little thicker than in *Asota caricæ* (F.), represented on Pl. IV, fig. 5.

The antennae of the ♀ are slenderer, and the apical joints therefore are relatively longer.

The genital armature of the ♂ differs remarkably from that of the other *Aganaidæ*. The claspers (Pl. IV, fig. 27) are broad, and are ventrally before the apex produced into a sharp triangular tooth; their inside is very thickly clothed with elongate hairlike scales. The harpe consists of two almost fingerlike pieces: the exterior one, situate along the clasper, is the longest; it is strongly chitinous, and in its apical half somewhat curved away from the clasper towards the longitudinal axis of the body; the inner and more dorsal piece is less chitinous, rounded at the tip, and is from the middle, when viewed from the side, curved upwards.

The cavity on the underside of the forewing near the abdominal margin is rather deep and basally sharply limited; the raised fold bordering it in front is very narrow, and bears about five or six enlarged yellowish scales, one behind the other, which have the breadth of the fold, are more chitinised than ordinary scales, and occupy only the second fourth of the fold, while the basal fourth is clothed with smaller scales, of which two or three lie beside one another, and of which the apices are rounded (Pl. IV, fig. 38); the apical half of the fold is covered with narrow, elongate, rather acute scales, which are of the pale brown colour of the wing.

The corresponding portion of the stridulating apparatus on the hindwing is a patch of thick scales which has the same position as in *Neochera* Hüb., but is less defined, and the scales composing it are more elongate, being partly almost tongue-shaped. The patch is less conspicuous than in *Neochera*, since its greater posterior portion has the colour of the rest of the wing, and the smaller anterior portion is only slightly, though distinctly, yellowish.

Neuration: Hampson's statement, *l.c.*, that *Euplocia* is devoid of an areole, is, I think, erroneous. Snellen, *l.c.* p. 115, mentioned already the presence of an areole in *Euplocia*, and I find that in all our specimens of *Euplocia* veins 10 and 8 are connected by a bar, or, which will perhaps be more correct to say, veins 8 and 9 are anastomosed together to form an areole—which version is the correct one even, of course, only be decided by examination of the growing wing in the chrysalis;

anyhow, there is a narrow areole in all our specimens, though in some individuals, especially of the typical subspecies, the bar connecting veins 8 and 10 is so weak as to be nearly obliterated, so that on superficial examination the areole appears to be absent. The length of the areole is extremely variable; in our Andaman specimens, for example, the length varies from $1\frac{2}{3}$ mm. to 5 mm.

Veins 6 and 7 of the forewing are stalked together, which character does not occur again amongst *Agonaidae*; the length of the stalk is quite inconstant. Veins 3 and 4 come from a point, or are also, though shortly, stalked. The upper discocellular veinlet is deeply incurved (see Snellen, *l.c.*), more so than that of the hindwings.

Veins 6 and 7 of the hindwings are either shortly stalked together or are slightly separated from one another; veins 4 and 5 originate close together, while 3 is removed from 4.

The costal fold of the *male* of typical *P. memblivaria* (Cram.) is, when spread out, covered on the upperside with rather small, oval, glandular scales (see Haase, *Iris* I. p. 168, 1887); and similar scales are situate just before and behind the costal vein. The long hairlike scales underneath the fold, which Hampson (*l.c.*) describes as a glandular tuft of long hairs, are not situate upon the lappet, but stand on a veinlike fold which is homologous to the actual costal margin of the *Agonaidae* without this scent-organ. These "hairs" are broadest at the tip, and are, in fact, elongate scales. In the form of *Euplocia* from Celebes and the Lesser Sunda Islands, which have the fold very narrow, the small glandular scales on the upper surface of the fold, when opened out, are similar to those found in *memblivaria*, but the hairlike scales are much shorter and broader, and are lanceolate, with the tip rounded.

I do not understand what Haase, *l.c.*, means by stating that "in den übrigen untersuchten Arten war er [the costal fold] nicht ausgebildet," as *all males* of *Euplocia* have a costal fold.

The breadth of the fold is in the Indian and Andaman examples, in one of our Bornean individuals, and in one from Palawan, 3 mm.; in another specimen each from Borneo and Palawan the fold has a breadth of 2 mm., while in Java specimens it is slightly less than 2 mm.; in the examples from Pulu Lant (S.E. of Borneo), Celebes, the islands between Celebes and Flores, and from Sambawa and Adonara, the fold measures only $\frac{1}{2}$ mm.

To *Euplocia* Hb. belong the following insects: *memblivaria* (Cram.) described from India or., *venigera* (Feld.) from Java, *moderata* Butl. also from Java, and *inconspicua* Butl. described from Celebes.

E. memblivaria (Cram.) is the broad-folded form, and occurs in Burma, Siam, Malacca, Andaman Islands, Natuna Islands, Borneo, Palawan, and probably also on the Nicobar Islands and in Sumatra.

The *males* from Burma have often a small orange spot upon the discocellulars of the forewing, corresponding to the patch in the same place in the *female*; this spot we have not noticed in *males* from other localities.

The whitish nervular and internervular lines of the wings, especially those on the hindwings, are in typical *memblivaria* longer than in *inconspicua*, but in some of our Celebes, Sambawa, and Djampea specimens they are quite as long as in certain individuals from the western localities.

The *females* vary especially in the development of the orange colour in the cell of the forewing. In *E. memblivaria* the basal patch occupies almost two-thirds of the cell, and is mostly connected along the median nervure with the square, or slightly

reniform, patch upon the discocellulars; near the apex of the basal patch stands often a black dot. The discocellular mark is mostly smaller in the Java form than in typical *membliaria*, but there is a specimen (mountain form?) from Mount Gede, West Java, in Dr. Staudinger's collection in which the whole cell is filled up with orange, except a small mark near the apex at the subcostal nervure. The *female* of *inconspicua* is usually devoid of the discocellular patch, and the basal patch is mostly small; the individuals in our series vary in this respect rather much; the basal patch is either nearly absent or feebly marked, or is even as large as it is in certain Java specimens, and in one of our Celebes individuals there are orange scales upon the discocellulars.

From these remarks it seems to me to be pretty clear that Hampson, *l.c.*, was perfectly right in uniting the above-named four "species" to one species, which we have to divide into three subspecies: *E. membliaria membliaria* (Cram.), *E. membliaria renigera* (Feld.), and *E. membliaria inconspicua* Butl. K. J.

38. *Euplocia membliaria membliaria* (Cramer).

Phalaena Bombyx membliaria Cramer, *Pap. Exot.* III. p. 139. t. 269. f. c. v (1782) (India or, "♀" *ex err.*).

Euplocia membliaria Hübner, *Verz. bek. Schmett.* p. 172. n. 1782 (1822).

Hypsa membliaria, Walker, *Lep. Hel. B. M.* II. p. 448 (1854) (E. Indies; "North India" *loc. err.*).

Euplocia membliaria, Butler, *Tr. Ent. Soc. Lond.* p. 327 (1875) (Maulmein; "N. India" *loc. err.*);

Hampson, *Moths of India* I. p. 496. n. 1131 (1891) (*Ex parte*; Maulmein, Siam, Andamans,

Philippines; *see* Java); Swinh., *Cat. Lep. Hel. Afri.* I. p. 83. n. 373 (1892) (*Syn. ex parte*; Cambodia, Siam, Philippines).

There are specimens of this insect in the Tring Museum from the Andaman Islands (5 ♂, 5 ♀), Pulu Laut (Natuna Islands, 1 ♀; Hose, September 1894), Borneo (2 ♂, 2 ♀), Palawan (1 ♂, 1 ♀); it has, besides, been recorded from Burma, Siam, and the Philippines; Dr. Staudinger gave us for inspection a specimen each from Penang and Mindanao.

The upperside of the wings is, in either sex of this and the other subspecies, opalescent blue in certain lights.

In Dr. Staudinger's ♀ from Mindanao the orange patches of the forewing are as much extended as in ordinary Andaman or Burma examples; the hindwing is without white longitudinal lines in the marginal region. K. J.

39. *Euplocia membliaria renigera* (Felder).

Euplocia membliaria, Moore (*see* Cramer, 1782), *Cat. Lep. Ins. Mus. E. I. C.* II. p. 295. n. 679 (1859) (*Syn. excl.*: Java).

♀. *Aganais renigera* Felder, *Reise Novara, Lep.* I. t. 106. f. 2 (1874) (Java *accord. to explon. of pl. page 1 and the label at type-specimen*); Snell., *Tijdschr. v. Ent.* XXXI. p. 118. n. 2 (1888).

♂ ♀. *Euplocia moderata* Butler, *Tr. Ent. Soc. Lond.* p. 327. n. 3 (1875) (Java).

♀. *Euplocia membliaria* form *renigera*, Hampson, *Moths of India* I. p. 496. sub n. 1131 (1892) (Java).

The type-specimen of *renigera* (Feld.) is still preserved in the Felder collection; it is rather faded, and the orange patches on the forewing are therefore much paler than in fresh specimens.

The ♀ of Butler's *moderata* has the orange markings rather smaller than the type of *renigera*.

We know this form, which does not seem to be always distinguishable from *membliaria*, only from Java. K. J.

40. *Euplocia membliaria inconspicua* Butler.

- Euplocia inconspicua* Butler, *Tr. Ent. Soc. Lond.* p. 328, n. 4 (1875) (Macassar); Swinh., *Cat. Lep. Het. Oxf.* I, p. 83, n. 374 (1892) (Flores, Macassar).
Aganix membliaria var. *rudius* Snellen, *Tijdschr. v. Ent.* XXII, p. 77, n. 34 (1879) (Celebes - Bonthain, Balaugnipa, Amparang).
Euplocia membliaria form *inconspicua*, Hampson, *Moths of India* I, p. 496, sub. n. 1131 (1892) ("Java" *et* *err.*).

This form is in the Tring Museum from S. Celebes (W. Doherty, August and September 1892: 4 ♂, 6 ♀), Kalao (A. Everett, December 1895; 1 ♂, 2 ♀), Sambawa (W. Doherty, 1 ♂, 7 ♀), Adonara (W. Doherty, November 1891; 2 ♂), Pulu Laut (S.E. of Borneo; W. Doherty, March 1891; 4 ♂, 1 ♀). Swinhoe records it also from Flores.

The specimens from Celebes are of a darker shade than those from other localities; the Adonara specimens are palest.

The nervular and internervular lines are in Celebes *males* seldom marked on the upperside of the hindwings, while in three out of our four Pulu Laut examples and in one of the two Adonara *males* the white lines of the fore- and hindwings are as long as in Andaman specimens. In the Celebes *males* there appears often an orange line upon the costa of the forewing corresponding to the basal orange patch of the *female*.

In our Pulu Laut ♀ and in one of our Celebes ♀♀ the basal orange patch is represented by a small number of orange scales situate along the costa; in some other specimens from Celebes there is an orange line upon the costa, and in others again from the same place, as well as in two *females* from Sambawa, the basal patch has at the apex a width of 2½ mm. and attains a length (measured from the base of the wing) of 11 mm.; some orange scales are occasionally present upon the discocellulars.

K. J.

Neochera Hübner.

- Phalœna Bombyc.* Cramer, *Pap. Erot.* III, p. 174 (1782).
Neochera Hübner, *Verz. bek. Schmett.* p. 173 (1816); Moore, *Cat. Lep. Ins. Mus. E. I. C.* II, p. 294 (1859); Butl., *Tr. Ent. Soc. Lond.* p. 328 (1875); Snell., *Tijdschr. v. Ent.* XXXI, p. 120 (1888); Kirby, *Cat. Lep. Het.* I, p. 389 (1891); Swinh., *Cat. Lep. Het. Oxf.* I, p. 84 (1892).
Hypsa. Group 4. *Neochera*, Walker, *Lep. Het. B. M.* II, p. 448 (1854).
Hypsa. Group 9. *Philona*, Walker, *l.c.*, p. 456 (1854).
Philona, Moore, *l.c.* p. 294 (1859); Butl., *l.c.* p. 325 (1875); Snell., *l.c.* p. 119 (1888); Kirby, *l.c.* p. 391 (1891); Swinh., *l.c.* p. 95 (1892).
Hypsa. Sect. 1. (*Hypsa*), Hampson, *Moths of India* I, p. 498 (1892).

Notwithstanding Snellen, *l.c.*, enumerates a number of characters said to distinguish *Philona* from *Neochera*, to which generic names he puts as author Butler, instead of Walker and Hübner respectively, though Butler never published a line about the generic characters of the insects in question, I cannot accept *Philona* as a genus distinct from *Neochera*. Snellen differentiates *Philona* from *Neochera* by the following three characters (*l.c.* p. 116):—

1. *Philona*: "Rand van de middencel der voorvleugels tuschen ader 3 en 4 schuin";

Neochera: "Rand van de middencel der voorvleugels tuschen ader 3 en 4 recht."

I fail to find this difference. In our specimens of *N. inops* (Wlk.), *bhawani* (Moore), *aurimorea* (Wlk.), etc., the partitions of the median nervine and the discocellular veinlets of the forewing do not exhibit any constant differences.

2. *Philona*: "hunne ader 7 uit de spits der aanhangeel";

Neochera: "hunne ader 7 uit het midden van den achterrand der aanhangeel."

The position of vein 7 is, neither in the forms referred to *Philona* nor in the various species of *Neochera*, constant. In all the insects in question the common stem of veins 8 and 9 comes from the tip of the areole (aanhangeel); in *inops* (Wlk.) vein 7 originates usually rather close to this stem, though it is always distinctly separate from it; sometimes vein 7 is farther removed, and occasionally it stands as far away from the tip of the areole as to originate at the apical third of the free (outer) portion of the areole. On the other hand, in *N. eugenia* (Cran.) and allies vein 7 originates generally midway between the apex of the areole and the cell, or is more basal, or stands even close to the anterior angle of the cell; in many individuals, however, vein 7 approaches the apex of the areole, and has often the same position as in such specimens of *inops* (Wlk.) in which that vein has the most basal position. On an average, vein 7 is, however, certainly more apical in *inops* than in *eugenia*, *marmorea*, etc., and in so far Snellen's statement would be correct, but as that character applies only to the greater number of specimens, not to all individuals, it is neither of generic nor of specific value.

3. *Philona*: "eindlid der palpen slechts een derde zoo lang als lid 2."

Neochera bhawana, p. 121: "eindlid der palpen korter dan de helft van lid 2."

I have measured the joints of the palpi of several specimens, and find that the terminal joint has a length of $\frac{3}{4}$ mm. in *inops*, while the second joint is $1\frac{1}{2}$ mm. long; the latter is therefore only twice, not three times, as long as the third joint. The only structural character of importance by which Walker, *l.c.*, differentiates *Philona* reads: "Third joint of the palpi less than half the length of the second."

The third palpal joint is shorter in *inops* than in *marmorea*, *eugenia*, *dominia*, etc., but this cannot serve to separate *inops* generically, since *N. marmorea* and *bhawana* take an intermediate position and approach more *inops* than *eugenia* and *dominia*. Moreover, *marmorea* and *bhawana* agree with *inops* and disagree with *eugenia* in another character, namely in veins 3 and 4 of the hindwings standing close together, whereas in *eugenia* and allies they are more or less widely separated (see Snellen, *l.c.* p. 121). This character again is not constant: there are specimens of *eugenia* in which those veins have the same position as in certain specimens of *inops* which are most extreme in respect to the separation of veins 3 and 4.

If *Neochera* is to be split up into two genera, *inops* (with *privata*), *marmorea*, and *bhawana* must come into *Philona*, and *dominia* and *eugenia* (with numerous subspecies) into *Neochera*, and *Philona* would be characterised by the somewhat shorter terminal joint of the palpi. However, that character is so slight, and the generic separation of *marmorea* from *eugenia* seems to me so unnatural, that I must treat *Philona* as a synonym of *Neochera*, the more so as *inops*, *marmorea*, *eugenia*, etc., have some remarkable characters in common which distinguish them at a glance from *Asota* (= *Hypsa*).

Snellen, *l.c.*, separated *Neochera* and *Philona* from *Asota* by the cell of the hindwing being longer than half the wing, and by the presence of a "viltachtig dick beschubde pleck" near the anterior margin of the hindwing. The first character is quite correct as regards *N. marmorea*, *bhawana*, *dominia*, and *eugenia* (inclusive of the subspecies); but in *N. inops* (and *privata*) the cell is mostly just half the length of the wing. In *Asota contorta* (Auriv.) (= *A. tortuosa* Snellen, *nec* Moore) the cell to the hindwing is also half as long as the wing [see Snellen, *l.c.* XXXVIII. p. 180 (1896)]; in *Agrotis ficus* (F.) it is likewise of half the length of the wing. The proportion is

never quite constant : for example, in two specimens of *N. marmorea* the number of millimetres of the length of the cell and the length of the wing are respectively 14 and 26, and 14 and 27½ ; in *Asota plagiata*, 10 and 21, and 8 and 19 ; in *Asota lucifera*, 10 and 22, and 9½ and 20.

The second character mentioned by Snellen is of great importance, as that part of the stridulating apparatus, as well as the fold before the cavity of the forewing, are essentially different from the apparatus of *Asota*. The patch referred to by Snellen stands at the apex of the cell on the hindwing above, is rather sharply defined, and consists of enlarged, rounded, thick scales, the surface of which mostly has seventeen stripes ; the spot has a glabrous, not a "viltachtig" appearance (Pl. IV. fig. 45, one of the scales, *N. bhawana*). In *Asota* the corresponding mark is elongate, smaller than in *Neochera*, and stands immediately behind the costal nervure (Pl. IV. fig. 41) ; the scales composing it are larger than in *Neochera*, and have usually thirty-five stripes (Pl. IV. fig. 41).

The fold in front of the cavity on the forewing below is narrow, and clothed with strong, enlarged, yellowish scales, which are rounded at the apex and cover one another for the most part, as shown on Pl. IV. fig. 39 (*N. eugenia*). The fold with these strongly chitinised and striate scales produces a sound by friction upon the scales of the before-described mark on the hindwing.

The scales between the costal margin and the middle of the cell of the upperside of the hindwing of *Neochera* are elongate, being at least four or five times as long as broad, while in *Asota* that portion of the wing is covered with short rounded scales which are scarcely half as long again as broad and slightly resemble the scales of the stridulatory patch. Just before the costal nervure, in the basal half of the hindwing, there is in *Asota* a streak of (mostly yellowish) hairlike glandular scales, corresponding to a similar streak behind the submedian vein on the underside of the forewing ; neither streak is developed in *Neochera*.

Contrary to all species of *Asota* I could examine, the harpe of *Neochera* is very slender and long (Pl. IV. figs. 28, 29, 30).

Besides the cell of the hindwing being usually longer than in *Asota* (see above), there is very little in the neururation to distinguish *Neochera* by. The free apical portion of the areole is in *Neochera* shorter than the basal portion, while in *Asota* the reverse is mostly the case. Vein 11 of the forewing stands in *Neochera* farther away from the apex of the cell than in *Asota*, the basal portion of the costal vein to the hindwing is weaker than in *Neochera*, and the same portion of the subcostal nervure is mostly stronger than in *Asota*. These differences are, however, by no means constant.

The upper- and underside of the thorax, especially the tegulae, as well as the coxae, are in *Asota* clothed with long hairs, which give these parts of the body a woolly appearance. In all *Neochera* the upperside of the thorax is covered with relatively short scales, which do not conceal the outline of the tegulae ; in *N. dominia* and *eugenia* also the underside is scaled, and the scales at the sides of the sterna and in front of the anterior coxae are very broad and rounded, while in *inops* the scales before the anterior coxae are longer and partly hairlike. The sterna of *N. marmorea* appears to be hairy, but the hairs are dilated at the apex, exclusive of those at the edges of the epipleurae, and differ in this from the hairs on the sterna of *Asota*.

The scaling of the wings of *Heterocera* is said by Kettelhoit, Schneider, and some others, who have compared the scales of various families, to differ from the scales of *Rhopalocera* in being generally without a basal sinus, which is always present in the greater portion of the wing-scales of *Rhopalocera*. Schneider mentions only

Castniidae, *Psychidae*, and certain *Noctuidae* (*Catocala*) as being provided with "sinus-scales." I find, however, that the sinus-scales are much more widely distributed amongst *Heterocera*, and that the term "Rhopalocera-scale" for sinus-scale and "Heterocera-scale" for scales without sinus, as applied by Kolbe, *Einführung in die Kenntniss der Insecten* p. 32 (1893), is misleading, and cannot be accepted. In *Aganaiidae* sinus-scales are present amongst scales without sinus in all species, and in *Neochera marmorea* and *bhuvana* nearly all the scales of the upper layer on both sides of either wing, which scales assume a metallic bluish gloss in certain lights, have a sinus, while the scales of the under layer are, to my knowledge, without sinus. Sinus-scales are also very common on the wings of *Agaristidae*. The scales with and without sinus are connected by all intergradations. The stridulatory patch of thick scales on the upperside of the hindwing is, in *Neochera* as well as in *Asota*, composed of sinus-scales (Pl. IV, figs. 44, 45), whereas the fold on the underside of the forewing is clothed with scales without sinus.

The following *Aganaiidae* belong to *Neochera* Hb. :—

N. dominia (Cram.), *eugenia* (Cram.), *stibostethia* Butl., *basilissa* (Meyr.), *bulleri* Swinh., *heliconides* Snell. = *zoria* Swinh., *marmorea* Wlk., *bhuvana* Moore, *inops* (Wlk.), *privata* (Wlk.), and *cinerascens* Moore.

The other insects standing in Kirby's *Catalogue* under *Neochera* must be referred to *Asota*.

Those eleven names belong to insects of three different types, each type representing, in my opinion, one species, so that there would be only three species of *Neochera*; for want of intergradations, however, *bhuvana* and *eugenia* must at present still be kept separate from *marmorea* and *dominia* respectively, so that the number of species is five.

1. *Inops*-type. Here belong *inops* (Wlk.), *privata* (Wlk.), and *cinerascens* Moore: the latter is a synonym of *privata* (Wlk.). The antennae are, as in all *Aganaiidae* except *Aganais* Boisl., compressed. In the *male* each joint is clothed with long and with short thin hairs; the long ones are shorter than the joint, and dispersed all over the not-scaled portion of the joint. The two apical joints are of nearly equal length—the apex of the terminal joint is, as in the other *Aganaiidae*, produced into a thin cone—and are about one-fifth longer than broad; the preceding joints are relatively and absolutely longer than the two apical ones; from the apical third of the antennae, towards the middle, the joints become gradually shorter and higher, and are from the middle to the base of the antennae shorter than vertically broad.

The *female* antennae are thinner than those of the *male*, all the joints except those of the basal fourth are longer than broad, and the hairs and bristles are shorter than in the *male*.

The claspers of the *male* (Pl. IV, fig. 28) have lost the solelike form usually present in *Aganaiidae*. They are broad and outwardly convex at the base, and their apical half is transformed into a strongly chitinous hook, furnished at the inside half-way down to the base with a rather broad dilatation from which projects ventrally a sharp tooth. The claspers are without a clothing of hairlike scales at the inside, but are hairy outside. The dorsal, more chitinised, portion of the clasper turns at the base round towards the bipartite harpe, which consists of two sticklike pieces, one with nearly its entire length joined to the clasper, the other projecting free. There is little variation in the form of this apparatus, as it seems; the median

dilatation of the clasper, as well as the tooth projecting from it, are, however, slightly different in various individuals.

N. inops and *privata* agree in the structure of the antennae and genital armature perfectly, and as there is to my knowledge no other difference between the yellow *inops* and whitish *privata* than that of colour, I believe that Snellen, *l.c.*, is right in uniting *inops* and *privata* to one dichromic species. It remains, nevertheless, a curious fact that intergradations are unknown to science.

The stridulatory mark of thick scales on the hindwing is yellowish in *inops* and ab. *privata*, and becomes anteriorly often black in both forms.

The yellow form *inops* is in the Tring Museum from Bhutan, the Khasia and Naga Hills, Nias, Borneo, Java, and Palawan; Dr. Staudinger lent us specimens from Balabac and Mindoro; Hampson, *l.c.*, records it, besides, from Sikkim and Burma. The white form *privata* we have before us from the Andaman Islands, Sumatra, Nias, Pulu Lant (S.E. of Borneo), Borneo, and Java; Hampson records it, besides, from Burma and the Philippines. Timor and the Lesser Sunda Islands are inhabited by a slightly different subspecies of the whitish colour of *privata*. Apparently the white form does not occur in North India, and the yellow form not on the Lesser Sunda Islands inclusive of Timor, while the interjacent districts are inhabited by both.

Typical *inops* (Wlk.) comes from Assam; the specimens are somewhat larger than those from the Malayan Islands, and have the black border to the hindwings narrower than the individuals from Borneo and the Philippines; in our three examples from Palawan the cellule between veins 6 and 7 of the hindwing below is all black, while in Indian and Andaman individuals the yellow area penetrates into that cellule. The two ventral rows of black spots on the abdomen are in North Indian *inops* rather large, and in most examples from the Malay Archipelago and the Philippines more or less obliterated. K. J.

41. *Neochera inops tenuimargo* Rothsch. subsp. nov.

♂ ♀. Differs from *N. inops* ab. *privata* (Wlk.) in the white colour of the under-side of the forewing being of a purer white tint, in the black border to the hindwing, though extending beyond vein 2, being narrow, having at vein 6 a width of only $3\frac{1}{2}$ to 4 mm., and in the black costal border to the hindwing being either absent or feebly marked.

Hab. Dili, Timor (*type*; W. Doherty, May 1892); Alor (W. Doherty, October 1891); Pura (W. Doherty, October 1891); Adonara (W. Doherty, November 1891).

In the narrow black border to the hindwing this geographical form resembles much certain yellow specimens from Assam, but the black border is in the latter individuals, when it is as narrow as in *tenuimargo*, shorter, not reaching vein 2.

W. R.

2. *Dominia*-type. Here come *dominia* (Cram.), *eugenia* (Cram.), *stibostethia* Butl., *basilissa* (Meyr.), *butleri* Swinh., *heliconides* Snell. = *curia* Swinh., and a number of new forms described below by Mr. Rothschild.

All these insects are distinguished from the other forms of *Neochera* by the longer terminal joint of the palpi.

The antennae do not essentially differ from those of *inops* (Wlk.); but the thin hairs of the *male* antennae are longer, those near the edges of the middle joints being as long as, or a little longer than, the joints.

The clasps resemble those of *inops* much more than those of *marmorata*; they are broad and outwardly convex at the base, Pl. IV. fig. 29 (*butleri* Swinh.); the apical half is narrow, strongly chitinised, somewhat twisted, and bent down to form a strong hook. There are only a few hairs on the inner side of the clasper. The harpe is very slender, twisted, and much curved, and is dorsally between tip and middle slightly denticulate.

The stridulatory patch of thick scales on the hindwing is more or less square, and generally of a black colour, but becomes often yellowish buff anteriorly behind the costal nervure.

K. J.

42. *Neochera dominia* (Cram.).

Phalaena Bombyx dominia Cramer, *Pap. Escot.* III. p. 123. t. 263. f. A. B (1782) (Coromandel).

Noctua chione Fabricius, *Spec. Ins.* II. p. 213. n. 20 (1781) (Ind. or.); id., *Ent. Syst.* II. p. 19. n. 34 (1793) (*Syn. et var. excl.*).

Neochera dominia Hubner, *Verz. bek. Schwett.* p. 173. n. 1784 (1816); Butl., *Tr. Ent. Soc. Lond.* p. 329. n. 6 (1875) (Coimbatore, S. India); Snell, *Tijdschr. v. Ent.* XXXI. p. 121. n. 3 (1888).

Hypsa dominia, Hampson, *Moths of India* I. p. 499. n. 1136 (1892) (*Localities erroneous*).

This insect occurs in South India only; Hampson records it by mistake from Sikkim, Assam, Burma, and Java. The differences between *dominia* and the North Indian *butleri* are not very important, and are only such of degree. Though the absence of the orange colour from the head, thorax, two basal segments of the abdomen and from the base of the forewings, the entirely white upperside of the forewings, and the long blue-black streaks on the hindwings, between the median and submedian veins, distinguish *dominia* at once, I have little doubt that *dominia* is nothing else but the South Indian form of that widespread species of which *eugenia*, *basilissa*, *butleri*, etc., are subspecies, considering that all those distinguishing characters are very inconstant in *butleri* and allies, of which we have long series of individuals. Certain *butleri* approach *dominia* very closely in the orange colour being much reduced, in the forewings above being almost pure white, and in the posterior spots of the macular marginal border to the hindwings being produced towards the base. We have not seen any specimens of *Neochera* from the districts between Calcutta and Madras, where probably specimens occur which overbridge the gap between *dominia* and *butleri*. If this turns out in future to be so, there will be only one species of the *dominia*-type, and the name of *dominia* will have to stand for that species; for the present *dominia* must be kept separate specifically.

The other "species" of *Neochera* which belong to the *dominia*-type (see above) are all subspecies of one species, the eldest name of which is *eugenia* (Cram.).

K. J.

43. *Neochera eugenia butleri* Swinh.

Hypsa dominia, Walker (*nee* Cramer, 1782), *Lep. Het. B. M.* II. p. 448 (1851) (E. Indies, N. India, Silhet; *nee* Java).

Neochera dominia, Moore, *Cat. Lep. Ins. Mus. E. I. C.* II. p. 295. n. 677 (1859) (Cherra Punji; *nee* Java).

Neochera marmorata, Moore (*nee* Walker, 1856), *P. Z. S.* p. 677 (1867) (Cherra Punji); Butl., *Tr. Ent. Soc. Lond.* p. 329. n. 5 (1875) (*p.p.*; Silhet, N. India, Maulmein); id., *Ill. Typ. Sp. Lep. Het. B. M.* V. p. 43 (♀, *nee* ♂). t. 87. f. II (♀) (1881).

Neochera eugenia, Snellen (*nee* Cramer, 1782), *Tijdschr. v. Ent.* XXXI. p. 120 (1888) (*Es p.*; Rangoon).

Neochera butleri Swinhoe, *Cat. Lep. Het. Oxf.* I. p. 84. n. 377 (1892) (Assam, Silhet, Cambodia).

Hypsa butleri, Hampson, *Moths of India* I. p. 499. n. 1135 (1892) (Maulmein, Penang).

We have this form from the Khasia and Naga Hills, Burma, the Shan States, and the Malay Peninsula; Swinhoe records it from Cambodia.

The amount of white on the head and thorax is very variable; in some specimens the white colour is by far prevailing on these parts. The base of the abdomen is, in a few examples, quite as white as in *dominia*. The forewings vary from being nearly as white as in *dominia* to having the darker tint of *N. eugenia herpa* Snell. from Celebes. The veins are broader white than in the subspecies from the Malayan and Papuan Islands. The blue-black spots of the marginal band to the hindwings are seldom all isolated in *butleri*; mostly the two, three, or four anterior ones are merged together or touch one another; the posterior ones remain separate by the nervules. The spot before and that behind vein 3 vary in our series of thirty-four specimens from 4 to 8 mm. The fringe of the hindwing is all white, not spotted between the nervules with blue-black, or very faintly so. On the underside the white colour on the forewing is always much extended, and the hindwings have, near the apex of the cell, a black spot corresponding in position to the stridulatory patch of thick scales of the upperside, but composed of normal scales like the rest of the disc.

K. J.

44. *Neochera eugenia javana* Rothsch. subsp. nov.

Hypsa dominia, Walker (nec Cramer, 1782), *Lep. Hel. B. M.* II. p. 448 (1854) (*Pro p.*; Java).

Neochera dominia, Moore, *Cat. Lep. Ins. Mus. E. I. C. II.* p. 295. n. 677 (1859) (*Es p.*; Java).

Neochera bhawana, Butler (nec Moore, 1859), *Tr. Ent. Soc. Lond.* p. 328. n. 2 (1875) (*Es p.*; ♀, Java).

Neochera eugenia var. *herpa* Snellen (nec Snellen, 1879), *Tijdschr. v. Ent.* XXXI. p. 120 (1888) (Java; nec Celebes).

(?) *Hypsa dominia*, Hampson, *Moths of India I.* p. 498. n. 1136 (1892) (*Es p.*; Java).

Differs from the darkest specimens of *butleri* by the white lines upon the veins of the forewing being narrower, the marginal spots to the hindwing forming an almost uninterrupted band, and the fringe of the hindwings being black between the veins.

The posterior spots of the marginal band to the hindwing are slightly separated from one another; the white spots at the end of the nervules are not restricted to the fringe, as in typical *eugenia*, but are distinctly produced upon the wing.

Hab. Java.

This form is a transition to the Celebensian *herpa* Snell. and the Timorese *proxima* Rothsch. subsp. nov.

W. R.

45. *Neochera eugenia herpa* Snellen.

Agonais eugenia var. *herpa* Snellen, *Tijdschr. v. Ent.* XXII. p. 78. n. 35 (1879) (Bonthain).

Neochera eugenia var. *herpa* Snellen, *l.c.* XXXI. p. 120 (1888) (Celebes; nec Java).

Differs from the Java form especially in the submedian fold of the forewing being much broader white on the disc. In a specimen from Tombugu, E. Celebes, this white line is patchlike, and so broad in the middle as to touch the median nervure.

From Celebes and Sanghir in the Tring Museum.

K. J.

46. *Neochera eugenia fumosa* Rothsch. subsp. nov.

♂ ♀. Forewings as in *helicoides* Snell., but veins thinner white, especially at the extremities; below, the subapical white patch cut short at vein 3. Hindwings suffused with bluish black scales, especially in the middle of the disc. Border to hindwing as in *herpa* Snell., i.e. spots between the median nervules somewhat longer than in *javana* Rothsch.

Hab. Sambawa (*type*; W. Doherty *leg.*; 5 ♂, 4 ♀); Pulu Laut (S.E. Borneo; W. Doherty, May 1891; 6 ♂, 2 ♀); Pura (W. Doherty, October 1891; 2 ♀).

Some of my Pulu Laut specimens, and an example from Sambawa in Dr. Staudinger's collection, have the hindwings as dark as they are in the Philippine form *heliconides* Snell., and are distinguishable from that form only by the slightly thinner white spots on the fringe of the forewing, and by the basal half of the median nervules of the hindwing being much less white.

Another Sambawa specimen in Dr. Staudinger's collection is like the Java form, but has the marginal border to the hindwing a little broader between the median nervules.

Borneo and Sumatra individuals of *eugenia* are unknown to me. W. R.

47. *Neochera eugenia proxima* Rothsch. subsp. nov.

♂ ♀. Forewing paler than in *herpa* Snell.; submedian fold narrower white and subapical white patch of underside marked above. Marginal band to hindwing as in *herpa*; white colour of fringe more restricted.

Differs from *basilissa* (Meyr.) in the darker forewings, in the costal border to the hindwings being bluish green and well marked, not obliterated in the basal half of the wing, in the submedian fold of forewing above being narrower white, and in the bluish black colour of the marginal band to the hindwing being at anal angle more extended and more pronounced.

Hab. Timor (W. Doherty: Dili, May 1892. *type*; Oinainisa, November and December 1891, 7 ♂); Alor (W. Doherty, October 1891; 1 ♂); Adonara (W. Doherty, November 1891; 4 ♂); Kalao (A. Everett, December 1895; 1 ♂, 1 ♀); Port Darwin, N.W. Australia (2 ♂).

Two *males* from Adonara have the hindwing somewhat shaded with fuscous, and one of them is not distinguishable from *fumosa* m. The two Kalao individuals lead over to *herpa* by the submedian fold being broader white than in typical *proxima*.

Specimens from Port Darwin, N.W. Australia, come much closer to *proxima* than to the Queenslandian *basilissa* (Meyr.). W. R.

48. *Neochera eugenia basilissa* (Meyrick).

Hyppa basilissa Meyrick, *Proc. Linn. Soc. N. S. Wales* (2). 1. p. 767. n. 108 (1886) (Cooktown and Cairns).

The large series of specimens from Queensland in the Tring Museum does not exhibit much variation in the essential characters of this subspecies. The pale forewings have the subapical white patch of the underside also marked above; the posterior region of the wing between the median nervure and abdominal margin is much suffused with white; the nervules are rather thinly white on the disc, and become a little broader white near the outer margin; the fringe is white at the extremities of the nervules.

On the hindwings the white area is not shaded with fuscous scales, the stridulatory mark often assumes a tawny tint at the edges; the bluish black border of the wing is not quite continuous, since the lower median and submedian veins remain thinly white when traversing the band; in this respect *basilissa* agrees best with *herpa* Snell.; the spot between veins 1^a and 1^b is mostly very feebly marked; the abdominal margin is seldom shaded with fuscous.

The meso- and metathorax are much more white than orange, often nearly all white; the first abdominal segment is white, with some orange scales dorsally.

On the underside the costal bluish green border of the hindwing is partly obliterated, especially towards the base.

Known to us from Northern Queensland, Cooktown and Cairns.

K. J.

49. *Neochera eugenia stibostethia* Butler.

Neochera stibostethia Butler, *Tr. Ent. Soc. Lond.* p. 329, n. 4 (1875) (Buru); Swinh., *Cat. Lep. Hct. Oxf.* I. p. 85, n. 378 (1892) (Buru).

The head, thorax, and the base of the abdomen are white as in *dominia*, but there are mostly a few orange scales at the edges of the tegulae and the metathorax.

Known to us only from Buru.

K. J.

50. *Neochera eugenia affinis* Rothsch. subsp. nov.

Neochera eugenia, Swinhoc (*nov* Cramer, 1782), *Cat. Lep. Hct. Oxf.* I. p. 84, n. 375 (1892) (*Ex p.*; Ternate).

Differs from *eugenia* (Cram.) in the black border to the hindwing being narrower, having at vein 4 a breadth of 4 mm. only; the band is much better defined and posteriorly slightly produced towards the disc; the white area outside the cell is not shaded with fuscous. The fringe of the hindwing and the veins of the forewing are as in *eugenia*. The thorax is orange, with the usual black spots large, those on the tegulae often merged together, as in *eugenia*.

The dorsal and ventral spots of the abdomen are always large and transverse; the ventral ones are often confluent to form transverse bands; there appear black lateral spots round the stigmata.

Hab. Halmahera (*type*; W. Doherty, August 1892; 2 ♂, 1 ♀); Ternate (W. Doherty; 1 ♂, 1 ♀); Batjan (W. Doherty, March 1892; 2 ♀); Morotai (Bernstein; 1 ♀).

This form stands, as regards the pattern of the hindwing, intermediate between typical *eugenia* and *herpa*. The white veins of the forewing are very prominent.

W. R.

51. *Neochera eugenia papuana* Rothsch. subsp. nov.

Neochera eugenia, Butler (*nov* Cramer, 1782), *Tr. Linn. Soc. Lond.* p. 328 (1875) (Dorey, Aru); Swinh., *Cat. Lep. Hct. Oxf.* I. p. 84, n. 375 (1892) (*Ex p.*; Mysol, Aru, Dorey, N. Guinea).

♂ ♀. Veins of forewing thinner white than in *eugenia*, and mostly without white scales (or nearly so) near the outer margin. Head, thorax, and base of abdomen particoloured with orange and white. Blue-black border to hindwing 4 to 5 mm. wide at vein 4, very slightly produced towards disc between veins 1 and 4, well defined; white area not shaded with fuscous, pure white. Fringe to hindwing all black, or with traces only of the usual white dots at the ends of the veins. Dorsal black markings of abdomen rather small.

The white patch on the underside of the forewing situate between the cell and abdominal margin is very variable in size, and is often a mere line. The mesothorax is sometimes more white than orange; the metathorax is mostly all white, as is usually the case with the first abdominal segment. The black dorsal spots of the abdomen never form transverse bands, as in *eugenia* and some other subspecies, and are often reduced to minute points, or are even absent.

Hab. Dutch and German N. Guinea (*type* from Humboldt Bay); Waigen; Aru; Mysol; and probably all the islands near the western peninsula of N. Guinea.

It seems to be a rather common insect, the most prominent features of which are the uniform blue-black border to the hindwing and the very thinly white veins of the forewing. W. R.

52. *Neochera eugenia eugenia* (Cramer).

Phalaena Bombyx eugenia Cramer, *Pap. Exot.* III. p. 235. t. 398. f. M (1782) (Amboina).
Noctua echioue var., Fabricius, *Ent. Syst.* III. 2. p. 19. sub n. 34 (1793).
Neochera eugenia, Hübner, *Verz. bel. Schmett.* p. 173. n. 1783 (1816).
Hypsa eugenia, Walker, *Lep. Hel. B. M.* II. p. 449. n. 5 (1854).
Neochera eugenia, Snellen, *Tijdschr. v. Ent.* XXXI. p. 120 (1888) (*Er n.*).

On Amboina and Ceram.

The white veins of the forewing are thin and nearly all of even breadth from the base to the outer margin; the fringe is all black except at the hinder angle, seldom with some white scales at the extremities of the veins. The blue-black border to the hindwings is broad, not interrupted, and between the median and submedian veins irregularly produced towards the base; those veins themselves remain rather broadly white; the rest of the wing is suffused with fuscous, but is whiter than in *heliconides* from the Philippines; the fringe has very small white spots, except at the hinder angle, where nearly all the scales of the fringe are white; the abdominal margin, except fringe, is more or less broadly bluish black.

The spots on the tegulae are usually merged together. The black spots of the abdomen vary very much in size; sometimes they are as small as in *butleri*, while in other individuals they form transverse bands, as in *affinis* Rothsch.; the ventral markings are generally enlarged. K. J.

53. *Neochera eugenia fuscipennis* Rothsch. subsp. nov.

♂ ♀. Forewing as in *papuanus* miki. Border to hindwing very broad, gradually shading off on the disc; outer half or nearly the whole of the wing suffused with fuscous, the white colour often (*type*) reduced to a narrow space at the inside of the stridulatory patch; white spots mostly absent from fringe of hindwing.

The other characters as in typical *eugenia*.

Hab. New Britain (4 ♂, 5 ♀).

Sometimes scarcely distinguishable from *eugenia*, to which it is much nearer related than to *papuanus*. W. R.

54. *Neochera eugenia heliconides* Snellen.

Neochera eugenia var. *heliconides* Snellen, *Tijdschr. v. Ent.* XXXI. p. 121 (1888) (Philippines).
Neochera zaria Swinhoe, *Cat. Lep. Hel. Oef.* I. p. 85. n. 380 (1892) (Manila).

Occurs on Palawan, Mindoro, and Luzon, and probably also on the other islands of the Philippine group.

Snellen, *l.c.*, identified this insect erroneously with Moore's *Neochera heliconioides*, *P. Z. S.* p. 6 (1878), which is an *Asota*, not a *Neochera*. The characters of "*heliconides*" mentioned by Snellen are quite sufficient to recognise the present form of *eugenia*, and therefore Snellen's name must stand instead of Swinhoe's name of *zaria*.

The veins of the forewings are near outer margin broader white than in *fumosa* Rothsch.; the hindwings are all bluish black except the base, the basal half of the costal region, a patch beyond the stridulatory mark, and the greater portion of veins 1 to 4, which are whitish or white. From the darkest specimens of *fumosa* this

form differs scarcely in any other character than in the extremities of the veins of the forewing being broader white. In the extent of the blue-black colour on the hindwing *heliconides* surpasses most specimens of typical *eugenia*. The white fringe to the hindwings with very small black dots, and the rather evenly suffused basal two-thirds of the same wing on which the thin white veins are rather sharply picked out, distinguish *heliconides* easily from dark specimens of *eugenia* and *fuscipennis*.

K. J.

3. *Marmorata*-type. Here belong two forms, *marmorata* Wlk. and *bhawana* Moore, which are structurally the same and differ only in the colour of the hindwing; intergradations are not known to us.

The antennae of the *male* of *bhawana* are thicker than those of *eugenia*, and the fine hairs near the base and the apex of each joint are more prolonged, forming a basal and an apical row which join each other just below the scaled dorsal portion of the joint. In this character *N. bhawana* and *marmorata* are nearly related with most *Asota*; there are, however, no lateral impressions on the joints in *Neochera*. The ten to twelve terminal joints are longer than broad, especially the four last ones; thence towards the base the joints become broader than long. In the *female* the fine hairs are all short and of even length, and the antennae are thinner than in the *male*.

The claspers (Pl. IV. fig. 30) resemble more those of *Asota* than of *Neochera eugenia* and *inops*, being broadest towards the apex and having almost the shape of a shoe-sole; on the inside they are thickly hairy. The harpe is very slender and long; see Pl. IV. fig. 30.

K. J.

55. *Neochera marmorata* Walker.

Hypsa marmorata Walker, *Lep. Het. B. M.* VII. p. 1674 (1856) (Silhet); Hamps., *Moths of India* I. p. 498. n. 1134 (1894) (*Ex p.*; localities partly erroneous).
Neochera marmorata, Butler, *Tr. Ent. Soc. Lond.* p. 329 (1875) (*Sgn. ex p.*); id., *Ill. Typ. Lep. Het. B. M.* V. p. 43 (♂, *nec* ♀). t. 87. f. 10 (♂) (1881); Snell., *Tijdschr. v. Ent.* XXXI. p. 121. n. 5 (1888); Kirby, *Cat. Lep. Het. I* p. 390. n. 2 (1891) (*Ex p.*); Swinh., *Cat. Lep. Het. Oxf.* I. p. 84. n. 376 (1892) (Silhet).

This insect is known from Northern India (Silhet, the Khasia and Naga Hills), and is in Lower Burma, the Shan States, Tenasserim, Malacca, and on the Greater Sunda Islands represented by *N. bhawana* Moore.

The abdomen of *marmorata* has, at least on the basal segments, three dorsal and two ventral rows of black spots, as already stated by Walker. The lateral spots of *marmorata* which stand near the lateral edge of the dorsal plate of the segment are wanting in *eugenia* and *inops*. Those lateral spots mentioned under *N. eugenia affinis* stand on the pleural piece of the somites and are also present in *marmorata*.

Walker's description gives the essential characters as regards the colour: "Head black, with white bands; . . . abdomen with three rows of black dots; underside with lateral black dots; . . . hindwings white from interior border to the disk."

In the Tring Museum from the Khasia and Naga Hills.

K. J.

56. *Neochera bhawana* Moore.

Neochera bhawana Moore, *Cat. Lep. Ins. Mus. E. I. C.* II. p. 295. n. 678. t. 7a. f. 4 (♂) (1859) (Java); Butl., *Tr. Ent. Soc. Lond.* p. 328 (1875) (Java); Snell., *Tijdschr. v. Ent.* XXXI. p. 121. n. 2 (1888) (Java, Sumatra); Swinh., *Cat. Lep. Het. Oxf.* I. p. 85. n. 381 (1892) (Borneo, Singapore).

The white colour of the posterior region of the hindwing of *marmorata* is in

blawana absent, except on the veins. The subcostal nervules on the upperside of the hindwing are in *marmorea* white just outside the stridulatory patch of thick scales, while in *blawana* they are not, or seldom, white there.

In the Tring Museum from Java, Sumatra, Borneo, and the Shan States.

K. J.

Asota Hübner.

Phalaena Noctua, Linné, *Syst. Nat.*, ed. X. p. 512 (1758).

Noctua, Fabricius, *Syst. Ent.* p. 596 (1775).

Phalaena Bombyx, Cramer, *Pap. Ex.* Pl. p. 175 (1780).

Hippocrita vulgaris Hübner, *Samml. Ex. Schmelt.* t. 190 (1806).

Asota Hübner, *Verz. bek. Schmelt.* p. 164 (1822) [*Type: jorana* (Cram.)].

Hypsa Hübner, *l.c.* p. 172 (1822) [*Type: silcandra* (Cram.)]; Walk., *Lep. Hel. B. M.* 11. p. 444. n. 65 (1854) (*Ex p.*); Moore, *Cat. Lep. Ins. Mus. E. I. C.* II. p. 292 (1859); Butl., *Tr. Ent. Soc. Lond.* p. 315 (1875) (*Ex p.*); Snell., *Tijdschr. v. Ent.* XXXI. p. 122 (1888) (*Ex p.*); Swinh., *Cat. Lep. Hel. Oef. I.* p. 85 (1892); Kirby, *Cat. Hel. I.* p. 388 (1892); Hamp., *Moths of Ind.* I. p. 498 (1892) (*Ex p.*).

Damalis Hübner, *l.c.* p. 172 (1822) [*Type: curivae* (F.)]; Swinh., *l.c.* p. 93 (1892).

Aganais Boisduval, *Voy. Astrolabe, Lép.* p. 248 (1832) (*Nom. nud.*); Snell., *l.c.* XXII. p. 77 (1879) (*Ex p.*); Kirby, *l.c.* p. 385 (1892) (*Excl. of insularis* Boisd.).

Hypsa. Group 5. *Hypsa*, Walker, *l.c.* p. 449 (1854).

Hypsa. Group 6. *Aspa* Walker, *l.c.* p. 452 (1854) [*Type: puphos* (F.)].

Hypsa. Group 7. *Damalis*, Walker, *l.c.* p. 453 (1854).

Hypsa. Group 10. *Petalia* Walker, *l.c.* p. 457 (1854) [*Type: playiata* Wlk.].

Hypsa. Subgenus *Damalis*, Butler, *Tr. Ent. Soc. Lond.* p. 319 (1875).

Hypsa. Subgenus *Aganais*, Butler, *l.c.* p. 322 (1875) (*Excl. of insularis* Boisd.).

Hypsa. Subgenus *Agape*, Butler, *l.c.* p. 322 (1875) (*Excl. of chloropyga* Wlk.).

Petalia, Butler, *l.c.* p. 325 (1875); Swinh., *l.c.* I. p. 95 (1892); Kirby, *l.c.* p. 385 (1892).

Neochera, Butler, *l.c.* p. 328 (1875) (*Ex p.*); Kirby, *l.c.* p. 390 (1892) (*Ex p.*).

Agape, Swinhoe, *l.c.* p. 93 (1892) (*Ex p.*); Kirby, *l.c.* p. 387 (1892) (*Ex p.*).

Antichera Snellen, *l.c.* XXXVIII. p. 180 (1896) [*Type: contorta* (Auriv.)].

I unite under the (eldest) name of *Asota* Hb. all those *Aganaidae* which are distinguished by the following principal characters:—

Fold in front of the cavity on forewing with one enlarged carinate scale; hindwing above with an elongate spot of thick scales just behind costal nerve in the middle of the wing; the last but one joint of the antennae shorter than the last but two, and at the utmost as long as broad, mostly shorter; third joint of palpi seldom a little shorter, mostly as long as or longer than the second.

In neuration the species of *Asota* come very near *Neochera eugenia* (Cram.).

The "genera" *Damalis* Hb., *Hypsa* Hb., *Aspa* Wlk., *Petalia* Wlk., and *Antichera* Snell. I cannot keep separate from *Asota* Hb.; the types of these "genera" differ from one another only in the pattern, sometimes in the shape, of the wings, and in secondary sexual characters, as in fact do nearly every two species of *Aganaidae*. Under *Asota* Hb. we have therefore united all *Aganais* which do not belong to *Spilobotys* Butl. = *Agape* Snell., *Aganais* Boisd., *Peribrome* Wlk., *Anagnia* Wlk., *Euplocia* Hb., *Dipama* Moore, and *Sommeria* Hb. The number of the species will in this paper be considerably reduced, as our series of specimens prove to us that many of the "species" are only geographical races and not distinct.

Structurally the variety within the genus *Asota* Hb. is nearly as great as it is in respect to pattern. I give here a general account of the structural characters of *Asota*, and shall make some more remarks under the various species.

As in the other *Aganaidae*, the front of the head is in *Asota* Hb. slightly widened behind, is anteriorly faintly convex in the middle, and generally a little broader than each eye is high.

The eye is almost circular in all *Aganaiidae*, a little more rounded in front than behind, not triangularly projecting beneath, as in *Agaristidae*. When viewed from the side, with the object somewhat higher than the eye of the observer, the eye of *Aganaiidae* shows a faint trace of emargination, or rather depression, near the antennae.

The antennae are always sexually different, and their structure is, at least in the *male* sex, often convenient to prove specific distinctness of superficially similar forms. The antennae of the *females* are the more simple ones, and may therefore be described and compared first.

The joints (Pl. IV, figs. 5 to 11) are compressed, being vertically thicker than transversely: as the compression takes place especially ventrally, the transverse section of a joint has an ovate outline. The degree of compression is somewhat different according to the species; it is lowest in *A. curicae* (F.), and seems to be highest in *A. egeus* (Wlk.). The basal joints are cylindrical, or nearly so, and the apical joints are also less compressed than the middle ones. The apex of each joint is ventrally produced into a tooth: the apical joint, which is longest and thinnest of all, is at the tip produced into a thin cone. The last but one joint is as long as broad, or slightly shorter, and is always shorter than the last but two; the preceding ten to twelve joints are also longer than broad. The joints consist of an internal and external chitinous sheath, and are clothed dorsally with scales and laterally and ventrally with hairs. There are two transverse rows of elongate scales on each joint, amongst which stand, besides, some thin hairs. The apical row of scales projects upon the base of the next joint.

The hairs, which form a moderately dense covering upon the convex sides and the ventral portion of the joint, are very fine, short, and depressed, and are longer in *A. egeus* (Wlk.), *heliconia* (L.), *papuana* (Boisd.), and others, than in *A. curicae* (F.).

Each joint bears two pairs of large bristles: the ventral pair is situate (one bristle at each side of the joint) near the apex; the other pair is basal, subdorso-lateral, and stands near the base of the basal row of scales. The subdorsal bristles are always longer and thicker than the ventral ones; both pairs vary in length, rather considerably, according to the different species. Besides these four bristles, there are, as mentioned before, some dorsal hairs projecting from between the two rows of scales, and these hairs assume on the apical joints a more or less bristle-like character, but remain always thinner than those principal bristles.

The antennae of the *males* are built up after the same type, but are always different in every species in certain points from those of the respective *females*. They are more compressed; the free ventral portion is higher, more cariniform; the joints, especially the apical ones, are shorter; the clothing of thin hairs is longer, at least near the base and apex of the joint, and the bristles are much stronger. The last but one joint is in all *males* shorter than it is vertically broad. In detail there is rather much variation amongst the different species, not only in respect to the length of the hairs and bristles and the size of the joints, but also as regards the structure of the joints. There are three principal modifications of the *male* antennae of *Asota*, which may here be represented by the antennae of *A. curicae* (F.), *A. heliconia* (L.), and *A. contorta* (Auriv.).

In *A. curicae* (F.) the apical joint is twice as long as broad, the penultimate one is somewhat shorter than broad, the preceding six joints are somewhat longer than broad, and the following ones become gradually broader than long, the middle joints being about one-fifth broader than long. The ventral compressed dilatation of the

middle joints is scarcely one-half the breadth of the body of the joint (Pl. IV. fig. 5). The sides of the joints are convex; the fine hairs about one-third or one-fourth of the length of the joints, and all of nearly equal length. The ventral bristles are slightly longer than the joints; the larger subdorsal bristles are about half as long again as the joints, and the dorsal fine bristles remain very thin and have nearly the length of the joint.

The antennae of *A. versicolor* (Don.) are similar to those of *caricae*; but all the joints except the terminal one are broader (vertically) than long, the setae are stronger, and the sides are very faintly flattened in the middle close to the dorsal scaled portion; the fine hairs are extremely faintly longer at base and apex of the median joints.

The antennae of *A. pluginota* (Butl.) are of the *heliconia*-type, and therefore quite different from those of *caricae*.

The bulk of the species of *Asota*—in fact all species exclusive of *caricae*, *versicolor*, *contorta*, and an undescribed species allied to *contorta*—have the antennae of the *heliconia*-type, and differ from *caricae* in having a lateral impression on each joint (except apical one), and in the fine hairs in front of and behind this impression, or the hairs all along apical and basal edges, being prolonged.


A. plana (Wlk.) and allies come nearest to *A. caricae* (F.) and *versicolor* (Don.). The last ten or twelve joints (except the penultimate one) are longer than broad; the middle joints are about one-fourth broader than long. The impression mentioned before is rather slight, deepest near the large subdorsal bristle, and gradually fades away ventrally; the edges of the joint are somewhat raised near the impression, and the hairs on these slight ridges are much prolonged, being about of the length of the joint.

The antennae of *A. albivena* (Wlk.) = *vitessoides* (Snell.) are similar, but all the joints except the apical one are broader than long.

The impression becomes deeper in *A. heliconia* (L.) (Pl. IV. fig. 10); the edges of the joints are more raised; the ridges are, however, not on the same level, but the basal one is more dorsal, the apical one more ventral. In consequence of the different position of the ridges, a front view of a detached middle joint from the distal side shows a dilatation of the joint in the ventral half (Pl. IV. fig. 8), while the joint appears broadest in the dorsal half when it is viewed from the basal side (Pl. IV. fig. 9). The hairs on the ridges are longer than in *A. plana* (Wlk.); when looked at from above, these hairs protrude at each side like brushes; the two brushes nearest to a subdorsal bristle belong to two subsequent joints (Pl. IV. fig. 11). The large subdorsal bristles are more than three times as long as the joint; all the joints are broader than long, except the terminal one; the middle ones are about half as broad again as long.

In *A. egeus* (Wlk.) and allies the impression is still deeper, the cariniform (ventral) portion of the joints is higher, and the bristles are stronger.

The third chief modification of the *male* antennae is found in *A. contorta* (Auriv.) and an undescribed Bornean species, not in *A. tortuosa* (Moore), to which Snellen puts *contorta* (Auriv.) as a synonym, by mistake I think. Here the apical ten joints, inclusive of the penultimate one, are longer than broad. The ventral subcariniform dilatation of the joints assumes quite a different aspect from that of the *heliconia*-type, in consequence of its becoming (longitudinally) very short, being about half the length of the stem of the joint, and being transversely dilated. The two lateral ridges of the *heliconia*-type stand here very close together, as the

joint is so short, have for the most part merged together, and are very high. In a transverse section, or in a front view, of a middle joint, the diameter of the stem of the joint is much shorter than that of the ventral dilatation, the outline being somewhat like this . The hairs upon the ridge are much longer than in any other Aganaid, being about three times the length of a joint; they stand in two rows, as in *heliconia*, but these rows join each other near the subdorsal bristle, as in *Neochera marmorea* Wlk. In a side view, the ventral dilatation appears as a short square tooth of which the vertical diameter is shorter than the vertical diameter of the stem of the joint; while in a ventral view the processus is transverse and somewhat rhombiform. The subdorsal bristle is very strong and long; the ventral pair is present on the apical elongate joints, but is obliterated on the other joints.

The strong subdorsal bristles of *A. contorta* (Auriv.), *egens* (Wlk.), and other species of *Asota* remind one of the lateral processus found in *Aganais* Boisd., if one examines the antennae quite superficially under a very weak lens, but are by no means homologous with that processus. On p. 61 I tried to point out the difference between the antennae of *Aganais* Boisd. and *Asota* Hb.; on Pl. IV, figs. 1, 2, 3, 4, I now give front and dorsal views of an antennal joint of ♂ and ♀ of *Aganais ficus* (F.), which will at once show to the reader, when comparing figures 5 to 11, the remarkable differences described on p. 61.

The antennae of all *Aganaidae* are similar to those types described in these lines. The *heliconia*-type we rather frequently meet with amongst *Geometridae*.

The palpi of *Asota* do not exhibit much variation. The second joint is generally slender, at the base curved, and somewhat twisted; the third is very thin, slightly thickened towards the tip, and is in *A. caricae* (F.) as long as, in *egens* (Wlk.) shorter than, and in *heliconia* (L.) longer than, the second joint; the difference in length between the second and third joint is always slight, except in *A. contorta* (Auriv.) and *tortuosa* (Moore), which have the second joint shorter and thicker than it usually is in *Asota*, and the third joint more prolonged.

The thorax of *Asota* and all other *Aganaidae*, inclusive of *Agape* Snell., bears just in front of the hinder edge of the mesoscutum in the middle line a rounded impression often filled up with a brownish matter. This impression is most easily seen in *Neochera*, on account of the thorax of this genus being less hairy than that of *Asota* or *Peridrome*, and looks here like a small black spot. This impression is the mouth of a gland which I have not yet found in other moths; it is certainly not present in *Aletis* Hb., *Nyctemera* Hb., and *Pelochyta* Hb., which some authors have associated with the *Aganaidae*.

The abdomen of *A. caricae* (F.) is in the *female* remarkably different from that of all other *Aganaidae*, and resembles that of *Lymantriidae*. For comparison I give two figures of the tip of the abdomen of *A. plaginota* (Butl.) and two of *caricae* (F.). The seventh segment is in the ♀ of *plaginota* (Butl.) and all other *Aganaidae* conical; the dorsal plate is longer than the ventral one, and is covered, like the rest of the abdomen, with narrow elongate scales, which are at the apical edge of the segment somewhat prolonged (Pl. IV, fig. 46). Fig. 47 shows the tip of the abdomen denuded.

In *A. caricae* (F.) the seventh segment (fig. 48) is shorter and thicker than in other *Aganaidae*, not conically narrowed towards the apex, and is covered, like the eighth segment, with long curly hairs, which form a conspicuous anal tuft. In the

denuded abdomen of *caricue* (fig. 49) we find the seventh and eighth segments being longitudinally much folded; the eighth segment is much more prominent than in other *Aganitidae*. In consequence of the folding of the last segments their surface is much increased, and the amount of wool which finds place here is considerable.

The genital armature of the *males* of *Asota* does not seem to me to be of much interest from a systematic point of view; the various species differ very little in the form of the claspers, harpes, and unci, at least those species which I could dissect: *caricue* (F.), *plana* (Wlk.), *palinura* (Swinh.), *heliconia* (L.) and various subspecies, *egens* (Wlk.), *australis* (Boisd.), *versicolor* (F.), and some others. I have not examined the genital armature of *A. contorta* (Auriv.), *tortuosa* (Moore), and *isthmia* (Wlk.), which are perhaps more different in respect to those organs than the other species.

The clasper and harpe of *A. heliconia semifusca* (Butl.) from the Solomon Islands are represented in fig. 12 of Pl. IV. The claspers are covered with long hairs on the outside, and have a very dense covering of hairlike scales on the inside; these latter hairs are directed from the apical and ventral side towards the back and base. The harpe is a short chitinous piece turned upwards at the apex, which is horizontally widened out and excavated, so that in a dorsal view the harpe has the form of a spoon (fig. 14); the apical portion is asymmetrical; the edges are very sharp.

The organs of *A. egens* (Wlk.) (fig. 15) do not show much difference from those of *A. semifusca* (Butl.); the lower edge of the clasper is more rounded, the harpe is more symmetrical at the apex and broader. Figs. 16 and 17 represent the harpes of two individuals of *egens* (Wlk.), and we notice that the harpes are not quite identical.

The clasper and harpe of *A. caricue* (F.) are also nearly the same as those of *semifusca*. Figs. 18, 19, 20, 21 give a dorsal and side view of the harpes of two individuals; the inconsistency in the harpe is here again visible.

The harpe of *A. palinura* (Swinh.) (fig. 22) again does not show any obvious peculiarity.

The uncus of *Asota heliconia intacta* (Wlk.) is represented by figs. 32 and 33 in dorsal and side view; it consists of two pieces, a strong basal angle and a slender, slightly undulate, apical piece. The latter has a tooth at the apex, and is furnished with hairs on the upperside, especially in the middle. The unci of *egens*, *caricue*, and other species agree with that of *intacta*.

On the whole we shall, I think, be correct in stating that the genital armature will not be of much help in defining the species of *Asota*.

The claspers of *Aganais jicus* (L.) and *speciosa* (Drury), fig. 23, differ in being almost symmetrical; the apex is not turned upwards. The harpe (figs. 24 and 25) is short, spoonlike, with the apex produced into a sharp point.

The claspers of *Spilobotys* Butl. = *Ayape* Snell, are much longer than those of *Asota*. The basal piece of the uncus of *Spilobotys chloropyga* (Wlk.) (figs. 34, 35) has a broad processus at each side; the hairs upon the dorsal edge of the apical piece are shorter than in *Asota* Hb.

The claspers of *Digama marmorea* Butl. from Queensland (fig. 31) stand in form intermediate between those of *Asota* and *Aganais*, and are narrower than in both these genera. The harpe is longer and much slenderer than in *Asota* and *Aganais*, not spoon-shaped, consisting of one sticklike piece.

The venuration of the wings of *Asota* Hb. much resembles that of *Neochera*

eugenia (Cram.), but vein 11 of the forewing originates closer to the areole, vein 3 to the fore- and hindwing stands closer to vein 4, and the cell of the hindwing is shorter. In *Asota contorta* (Auriv.), not in *A. tortuosa* (Moore), the cell to the hindwing is just half the length of the wing, while in the other species of *Asota* the cell is shorter. The apical portion of the areole, beyond origin of vein 6, is generally longer than the basal portion.

The structure of the stridulating organ is peculiar. The cavity on the forewing is well limited only in front, not at the basal side, as in *Peridrome* Wlk. and *Euplocia* Hb.: the fold in front of the cavity (Pl. IV. fig. 36) is rather broad, and is covered with irregularly arranged scales which are rounded at the apex; in the middle portion of the fold the number of such scales standing beside one another and partly covering each other is, across the fold, about eight or ten. There is in the middle of the fold one large obliquely placed scale of a yellowish colour, which is thicker and more chitinous than normal scales are, and has one or more sharp longitudinal ridges. The scales immediately beside this one are also enlarged and yellowish, and are attached to one another and to that large scale to form a rather strong organ for friction against a patch of thick scales on the upperside of the hindwing. This patch (Pl. IV. fig. 41) stands along the anterior side of the costal nervure, is longer than broad, of a yellowish colour in all species, and consists of large, slightly pentagonal, scales with a basal sinus and thirty-five surface ridges (Pl. IV. figs. 42 and 44) [*Asota heliconia* (L.)]. The stridulating organ does not vary much in *Asota*, neither according to individuals nor to different species, and is readily distinguished from that of all other Aganais.

The homologous organ of *Aganais ficus* (F.) (Pl. IV. fig. 37) comes very near that of *Asota*; there are, however, three or four large scales on the fold before the cavity of the forewings.

In *Digama* Moore the fold is very narrow, and is covered by twenty-two to twenty-four transverse, somewhat asymmetrical, thick scales which stand in a single longitudinal row and are strongly ribbed longitudinally (Pl. IV. fig. 40). The corresponding mark upon the upperside of the hindwing is a regularly arched row (Pl. IV. fig. 43) of about fifteen thick scales which stands between costal margin and costal nervure.

All *Asota* species have on the underside of the forewing the basal half of the cell between median and submedian nervure covered with hairs, and there is a stripe of hairs just behind the submedian vein which extends from the stridulating organ down to the base of the wing, and is, like a similar stripe on the upperside of the hindwings before the costal nervure, most probably a scent-producing organ.

K. J.

(To be continued.)
